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PREVENTION & TREATMENT OF FROSTBITE REPORT NO. 103

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PREVENTION AND TREATMENT

OF

FROSTBITE

REPORT NO. 103

by

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PREVENTION AND TREATMENT OF FROSTBITE

Frostbite can be a very serious matter. Fingers, toes, and even whole limbs can be lost. Such injuries have occurred in cities and villages as well as in more isolated regions. Knowledge of the environment and special clothing have permitted the Alaskan Native to thrive despite extreme cold and isolation. Rarely occurring in an Alaskan Native, frostbite is most commonly seen in new arrivals to Alaska. Individuals from warm climates and those who have not given the possibility of frostbite any forethought are the most likely to sustain injury.

Protection from the cold

Exposed limbs and head are major channels of heat loss, but the maintenance of adequate circulation in the extremities is the key to preventing frostbite. In extreme cold it is important to prevent heat loss from as many areas as possible and to keep the trunk and head sufficiently warm so that the brain temperature control mechanism commands the blood vessels in the extremities to open up. Thermal underwear, mukluks with liners, double mittens and a parka, preferably down-filled and with a good ruff, are essential. A parka which can be opened at the neck to allow heat to escape will prevent overheating and sweating. Quilted or skin pants are necessary if no warm shelter is immediately available. Tight clothing is to be avoided since it interferes with circulation and reduces insulation against the cold.

The traveler, even in a heated automobile, must be prepared to walk in severe cold to wherever he is going. This means carrying with him proper clothing and more elaborate survival gear if necessary. If accidental injury, mechanical breakdown, or other impediment occurs during travel, the clothes one has with him or on his back must suffice. Hands and feet should be well protected at all times to forestall frostbite until help arrives. Frostbite is more likely to occur when one is injured or frightened.

Other predisposing factors

Tall, thin persons and those in poor physical condition are more susceptible to frostbite than those of stocky build and those in good physical health. Certain diseases impair circulation in the extremities, especially in elderly people.

and predispose to frostbite. Certain drugs such as ergotamine, used in the treatment of migraine headaches, may also predispose to frostbite. Heavy smokers who have circulatory impairment to vital organs and to the extremities are likewise susceptible. In short, any factors which impair circulation and the production of body heat will predispose to frostbite. Children, unable to produce large amounts of heat for long periods, may experience a lowering of deep body temperature and ultimately frostbite. Elderly people may have the same problem.

Recognition of frostbite

Tissues pass through a series of changes and functional alterations prior to freezing which can be helpful in detecting the onset of frostbite. Pain in the extremities is felt only when skin or tissue temperature is changing rapidly and does not necessarily precede freezing.

Loss of the sensations of touch, pressure, and pain may occur without an awareness of numbness or other peculiar sensations. Therefore, it is important to test the adequacy of these sensations frequently and to wear clothing which does not constrict the limbs. Exposed parts should be inspected routinely; often best done by a partner. Just prior to freezing, the skin, and especially the face with its many blood vessels, becomes bright red. Small patches of white then appear, as freezing actually occurs. The skin also becomes less elastic. This is best noted in the finger pads, which remain pitted when compressed. Any further cooling will surely result in freezing.

Serious freezing occurs most commonly in the feet because of less psychic awareness of them, poor circulation and sensation, and inadequate foot gear. Hands are next in order of serious involvement. Exposed head parts are less susceptible than feet because they are conditioned to exposure and have a better blood supply.

Management of frostbite

Next to the extent of freeze-injury, inadequate or improper treatment of a frozen part is the most common cause of serious loss of tissue. In many circumstances rewarming cannot be accomplished without the part again becoming frozen.

For example, the removal of clothing from other parts of the body to warm an extremity may only result in the loss of more body heat, greater extent of injury, and ultimate refreezing of the part. This thawing-refreezing is definitely to be avoided. It is best to allow freezing to persist, even if it means walking on a frozen foot, until shelter is available and rewarming can be accomplished satisfactorily. Limbs should be rewarmed in stirred water just above body temperature (100 F) -- never in cold water, air or snow. Since sensation is lost, fires, stoves, exhaust pipes, etc., should not be used because serious damage to tissue can result. If a major portion of the limb is frozen, then on rewarming deep body temperature will fall as the cooled blood begins to recirculate. Warm liquids by mouth and even total body immersion in a warm bath may be necessary to prevent such cooling.

Rewarming is an acutely painful experience and medication to alleviate pain should be given if available. After thawing a deep, aching pain may persist for several days depending on the severity of the injury. The presence of pain is not an adverse symptom since it indicates that nerve function is still present. The part should be moved gently and voluntarily during rewarming. Restoration of red coloration is the most satisfactory response. The persistence of a dull purplish coloration may indicate more serious injury and requires medical attention, as does swelling or the formation of blisters. Other means for improving circulation are available but must be administered by medical personnel.

Summary

In nearly all cases frostbite occurs as a result of inadequate knowledge, carelessness, mental incompetence, or unavoidable accident. Intelligent forethought can usually prevent injury. If freezing does occur, then proper rewarming in warm, moving water will give maximal benefit. The injured limb should be handled gently and a medical assessment made of the extent of injury and the need for further treatment.

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